

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A field apparatus control system for controlling a field apparatus connected to a field bus, comprising:

~~deduplicated~~ first and second main control units ~~for controlling~~ configured to control the field apparatus; and

~~deduplicated~~ first and second communication control units ~~for processing~~ configured to process information communication between the first and second main control units, respectively, and the field apparatus via the field bus, ~~respectively~~,

wherein ~~one of the deduplicated main control units and one of the~~ first main control unit and the first communication control unit ~~communication control units constitute~~ are in a normal system mode or in a standby system mode, and ~~other of the deduplicated main control units and other of the~~ second main control unit and the second communication control unit ~~communication control units constitute~~ are in a normal system mode or in a standby system mode, and each of the ~~normal system of communication control unit and the standby system of communication control unit~~ first and second communication control units have a same address on a network via the field bus, ~~which is allocated to each of the normal and standby systems of communication control systems~~, and

wherein information ~~that is~~ outputted to the same address from the field apparatus via the field bus is ~~transmitted to~~ received by both the ~~normal~~ first and ~~standby~~ second systems of communication control units, ~~respectively~~.

Claim 2 (Currently Amended): The field apparatus control system according to claim 1, wherein each of said ~~normal and standby systems of~~ first and second communication control units further ~~comprises~~ comprising:

~~operation request transmission means, when the own communication control unit is the normal system,~~ for transmitting an operation request to the field apparatus based on control information when the respective communication control unit is in the normal system mode, said control information being transmitted from the respective main control unit of the own system;

means for receiving response information corresponding to the operation request transmitted from the field apparatus to the address so as to transmit the received response information to the corresponding main control unit of the own system;

first means for judging whether or not failure occurs to the ~~own system~~ respective communication control unit and corresponding main control unit;

means for stopping operation of the ~~own~~ respective communication control unit, when the ~~judgement~~ means for judging judges that failure occurs to the ~~own system~~ respective communication control unit and the ~~own~~ respective communication control unit is in the normal system mode;

means that, ~~when the own communication control unit is the standby system,~~ monitors for monitoring the operation of the other a communication control unit that is in the normal system mode when the respective communication control unit is in the standby system mode, which is the normal system, and, when, by the monitored result, detecting the a stop of the operation of the other communication control unit, switches the own communication control unit, which is the standby system, to the normal system that is in the normal system mode when the respective communication control unit is in the standby system mode, and switching the respective communication control unit and corresponding main control unit to the normal system mode when the respective communication control unit and the corresponding main control unit are in the standby system mode.

Claim 3 (Currently Amended): The field apparatus control system according to claim 1, wherein said field bus connected to the field apparatus ~~is duplicated~~ includes first and second field buses, and each of said communication control units further comprises:

~~operation request transmission means, when the own communication control unit is the normal system,~~ for transmitting an operation request to the field apparatus via each of the ~~duplicated~~ first and second field buses based on control information when the respective communication control unit is in the normal system mode, said control information being transmitted from the corresponding main control unit ~~of the own system~~;

~~first judgment~~ second means for judging whether or not response information corresponding to the operation request is transmitted from the field apparatus via ~~one of the duplicated first~~ field buses bus;

first means for receiving the transmitted response information[[,]] when the ~~first judgment~~ second means for judging judges that the response information is transmitted, ~~so as to transmit~~ and for transmitting the received response information to the corresponding main control unit ~~of the own system~~;

~~second judgment~~ third means for judging whether or not response information corresponding to the operation request is transmitted from the field apparatus to the address via the ~~other one of the duplicated second~~ field buses bus when the ~~first judgment~~ second means for judging judges that the response information is not transmitted;

second means for receiving the transmitted response information when the ~~second judgment~~ third means for judging judges that the response information is transmitted ~~so as to transmit~~ , and for transmitting the received response information to the corresponding main control unit ~~of the own system~~;

means for transmitting information to indicate the generation of failure in the ~~duplicated first or second~~ field buses to the corresponding main control unit ~~of the own~~

~~system~~ when the ~~second judgment~~ third means for judging judges that the response information is not transmitted;

~~failure judgment~~ fourth means for judging whether or not failure occurs to the ~~own~~ system respective communication control unit or the corresponding main control unit;

means for stopping operation of the ~~own~~ respective communication control unit[[,]] when the ~~own~~ respective communication control unit is in the normal system mode and the ~~failure judgment~~ fourth means for judging judges that failure occurs to the ~~local system~~ respective communication control unit or the corresponding main control unit; and

means, ~~when the own communication control unit is the standby system, that~~ monitors for monitoring the operation of the ~~other~~ a communication control unit that is in the normal system mode when the respective communication control unit is in the standby system mode, which is the normal system, and, when, by the monitored result, detecting the a stop of the operation of the other communication control unit, switches the own communication control unit, which is the standby system, to the normal system that is in the normal system mode when the respective communication control unit is in the standby system mode, and switching the respective communication control unit and corresponding main control unit to the normal system mode when the respective communication control unit and the corresponding main control unit are in the standby system mode.

Claim 4 (Currently Amended): A field apparatus control system for controlling ~~uplicated field apparatuses constituting normal and standby systems of field apparatuses,~~ comprising:

~~uplicated~~ normal and standby field buses connected to the ~~uplicated~~ normal and standby field apparatuses, respectively, ~~said one of duplicated field buses being referred as a normal system field bus and other thereof being referred as a standby system field bus,~~

wherein said normal field bus is isolated from said standby field apparatus and said standby field bus is isolated from said normal field apparatus;

~~duplicate~~ first and second main control units ~~for controlling the duplicate~~  
configured to control the normal and standby field apparatuses; and

~~duplicate~~ first and second communication control units ~~for processing~~ configured to  
process information communication between each of the main control units and the  
~~duplicate~~ normal and standby field apparatuses via the ~~duplicate~~ normal and standby field  
buses, respectively,

wherein ~~one of the duplicate~~ the first main control units ~~and one of the unit and the~~  
first communication control units ~~constitute unit operate in~~ a normal system mode, and the  
~~other of the duplicate~~ second main control units ~~and other of the unit and the second~~  
communication control units ~~constitute unit operate in~~ a standby system mode, and the  
~~normal system of~~ first communication control unit is connected via the normal system field  
bus to the normal system field apparatus so that the ~~normal system of~~ first communication  
control unit executes information communication processing between the first main control  
unit ~~of the own system~~ and the normal system field apparatus via the normal system field bus,  
and

wherein the ~~standby system of~~ second communication control unit is connected via  
the standby system field bus to the standby system field apparatus so that the ~~standby system~~  
~~of~~ second communication control unit executes information communication processing  
between the second main control unit ~~of the own system~~ and the standby system field  
apparatus via the standby system field bus.

Claim 5 (Currently Amended): The field apparatus control system according to  
claim 4, wherein said ~~normal system of~~ first communication control unit further comprises:

~~operation request transmission~~ means for transmitting an operation request to the normal system field apparatus via the normal system field bus based on the ~~normal system field apparatus~~ control information which is transmitted from the first main control unit of the ~~own system~~;

means for receiving response information corresponding to the operation request which transmitted from the normal system field apparatus via the normal system field bus ~~so as to transmit~~ and for transmitting the received response information to the first main control unit of the ~~own system~~;

~~failure judgment~~ means for judging whether or not failure occurs to the first main control unit or the first communication control unit ~~own system~~; and

means for stopping operation of the ~~own~~ first communication control unit when the ~~failure judgment~~ means for judging judges that failure occurs to the ~~own system~~ first main control unit or the first communication control unit, and

wherein said ~~standby system of~~ second communication control unit comprises means for monitoring operation of the first ~~other~~ communication control unit ~~which is the normal system~~ so as to switch the ~~own~~ second communication control unit which is in the standby system mode to the normal system mode when detecting ~~the a~~ stop of the operation of the ~~other~~ first communication control unit according to the monitored result.

Claim 6 (Currently Amended): A field apparatus control system for controlling a field apparatus, comprising:

    duplicated first and second field buses connected to said field apparatus;

    a main control unit ~~for controlling~~ configured to control said field apparatus; and

a communication control unit ~~for processing~~ configured to process information communication between the main control unit and the field apparatus via the first and second field buses,

wherein said communication control unit further comprises

~~operation request transmission~~ means for transmitting an operation request to the field apparatus via the first and second field buses based on control information transmitted from the main control unit;

first ~~judgment~~ means for judging whether or not response information corresponding to the operation request is transmitted from the field apparatus via one of the first and second field buses;

means for receiving the transmitted response information when the first ~~judgment~~ means for judging judges that the response information is transmitted ~~so as to transmit and~~ for transmitting the received response information to the main control unit;

second ~~judgment~~ means for judging whether or not response information corresponding to the operation request is transmitted from the field apparatus via other of the first and second field buses when the first judgment means judges that the response information is transmitted;

means for receiving the transmitted response information when the second judgment means judges that the response information is transmitted so as to transmit the received response information to the main control unit; and

means for transmitting information to indicate the generation of failure in the first and second field buses to the main control unit when the second judgment means judges that the response information is not transmitted.

Claim 7 (Original): The field apparatus control system according to claim 1, wherein said field bus is configured by a radio system using radio waves in a high frequency band.

Claim 8 (Currently Amended): The field apparatus control system according to claim 3, wherein said ~~duplicate~~ first and second field buses are configured by radio transmissions based on radio waves which have different wavelength bands, respectively.

Claim 9 (Currently Amended): A storage medium used in a field apparatus control system ~~for controlling~~ configured to control a field apparatus connected to a field bus, said field apparatus control system comprising ~~duplicate normal and standby~~ first and second main control units ~~for controlling~~ configured to control the field apparatus; and ~~duplicate normal and standby~~ first and second computers for processing information communication between the ~~normal and standby~~ first and second main control units and the field apparatus via the field bus, respectively, said storage medium being readable by at least one of the ~~normal and standby~~ first and second computers, said storage medium comprising:

first means for causing at least one of the ~~normal and standby~~ first and second computers to transmit an operation request to the field apparatus based on control information when the ~~own~~ at least one computer is in a the normal ~~computer~~ mode, said control information being transmitted from the ~~normal~~ corresponding main control unit;

second means for causing at least one of the ~~normal and standby~~ first and second computers to receive response information corresponding to the operation request transmitted from the field apparatus to ~~an~~ a same address, said same address being allocated to the ~~normal and standby~~ first and second computers;



third means for causing at least one of the ~~normal and standby~~ first and second computers to transmit the received response information to the corresponding main control unit ~~of an own system corresponding to the at least one of the normal and standby computers;~~

fourth means for causing at least one of the ~~normal and standby~~ first and second computers to judge whether or not failure occurs to the ~~own system~~ corresponding main control unit or respective computer;

fifth means for causing at least one of the ~~normal and standby~~ first and second computers to, ~~when the own computer is the normal computer and it is judged that failure occurs to the own computer,~~ stop the operation of the ~~own computer~~ when the respective computer is in the normal system mode and when the respective computer judges that failure occurs in the respective computer; and

sixth means for causing at least one of the ~~normal and standby~~ first and second computers to monitor operation of the a computer operating in a normal system mode ~~computer~~ when the ~~own~~ respective computer is in the standby ~~computer~~ system mode, and ~~when, by the monitored result, detecting the stop of the operation of the normal computer,~~ to switch the ~~own computer which is the standby computer~~ to the normal computer system mode when detecting the stop of the operation of the computer operating in the normal system mode based on the monitored result.

Claim 10 (New): A field apparatus control system for controlling a field apparatus connected to a field bus, comprising:

first and second main control units configured to control the field apparatus; and

first and second communication control units configured to process information communication between the first and second main control units, respectively, and the field apparatus via the field bus,

wherein the first main control unit and the first communication control unit are in a normal system mode or in a standby system mode, the second main control unit and the second communication control unit are in a normal system mode or in a standby system mode, and each of the first and second communication control units have a same address on a network via the field bus,

wherein information outputted to the address from the field apparatus via the field bus is transmitted to both the first and second communication control units, and

wherein said field bus is configured by a radio system using radio waves in a high frequency band.

Claim 11 (New): A field apparatus control system for controlling normal and standby field apparatuses, comprising:

normal and standby field buses connected to the normal and standby field apparatuses, respectively;

first and second main control units configured to control the normal and standby field apparatuses; and

first and second communication control units configured to process information communication between each of the main control units and the normal and standby field apparatuses via the normal and standby field buses, respectively,

wherein the first main control unit and the first communication control unit operate in a normal system mode, the second main control unit and the second communication control unit operate in a standby system mode, and the first communication control unit is connected via the normal system field bus to the normal system field apparatus so that the first communication control unit executes information communication processing between the first main control unit and the normal system field apparatus via the normal system field bus,

wherein the second communication control unit is connected via the standby system field bus to the standby system field apparatus so that the second communication control unit executes information communication processing between the second main control unit and the standby system field apparatus via the standby system field bus, and

wherein said normal and standby field buses are configured by a radio system using radio waves in a high frequency band.